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Description

BACKGROUND OF THE INVENTION

[0001] Typical hand actuated control devices such as brake/shifters or brake levers for bicycles and other handlebar-steerable vehicles may include a grip cover that is stretched over portions of a control device to provide a cushion and/or an ergonomic gripping surface for a user. The grip cover may be made of an elastic material such as rubber. The grip cover may be removable from the control device to provide access to internal components thereof.

PRIOR ART

[0002] EP 2 535 250 A2 describes a bicycle component operating device provided with a base member mounted to a handlebar, an operating lever and an operating unit. The base member includes an insertion opening providing access to an interior space within the base member. The operating unit is disposed in said interior space of the base member. The base member is made of a rigid, hard plastic material. To provide a comfortable feeling to the rider's hand, a grip cover made of elastic material such as rubber is stretched over a gripping portion of the base member.

SUMMARY

[0003] In an embodiment, a bicycle control device comprising includes a housing having a retention receptacle and a lever coupled to the housing. The bicycle control device also includes a grip cover coupled to the housing and including a first portion and a second portion, wherein the first portion has a durometer value greater than the second portion, wherein the first portion engages the retention receptacle to maintain the grip cover on the housing, and wherein the second portion is connected to the first portion and extends over the housing. The retention receptacle includes a recess, and the first portion includes an attachment mechanism configured to be received within the recess.

[0004] The following features are optional features which describe separately or in combination with one another further embodiments of the bicycle control device according to the invention:

- The second portion is configured to be tensioned by the first portion.
- The attachment mechanism includes a projection sized to be received within the recess.
- The attachment mechanism includes the projection and a hooking tab extending from the projection and sized to be received within the recess.

- The attachment mechanism includes a projection and a groove formed on the projection, the projection sized to be received within the recess, and further comprising a retaining ring engagable with surfaces defining the groove to maintain the projection within the recess.
- The attachment mechanism includes a projection sized to be received within the recess, and further comprising a fastener passing through the projection and engaging the housing.
- The projection includes a through hole sized to receive the fastener that passes through the through hole.
- The retention receptacle includes a slide track, and the first portion includes an interlocking slide sized to be slidingly received within the slide track.
- The retention receptacle includes a plurality of recesses, and the first portion includes a plurality of projections received in the plurality of recesses.
- The retention receptacle includes a plurality of projection recesses and a plurality of rib recesses, and wherein the first portion includes an attachment mechanism comprising a plurality of concealed projections sized to be received within the plurality of projection recesses and a plurality of concealed ribs sized to be received within the plurality of rib recesses.
- The second portion includes a transition area that annularly surrounds the housing.
- The second portion defines a durometer of between about 30 and about 70 Shore A.
- The second portion defines a durometer of about 50 Shore A.
- The first portion is constructed of acrylonitrile butadiene styrene, and the second portion is constructed of thermoplastic polyurethane.
- The first portion defines a durometer of between about 30 and about 85 Shore D.
- The first portion defines a durometer of about 75 Shore D.
- The second portion and the first portion are comolded.
- The second portion and the first portion are mechanically coupled.

BRIEF DESCRIPTION OF DRAWINGS

[0005]

- FIG. 1 is a right side elevational view of a road bicycle according to one embodiment;
- FIG. 2 is a right side elevational view of a bicycle control device of the road bicycle of FIG. 1;
- FIG. 3 is a right side elevational view of a housing of the bicycle control device of FIG. 2;
- FIG. 4 is a right side elevational view of a grip cover of the bicycle control device of FIG. 2;
- FIG. 5 is partial, sectional view of the bicycle control device of FIG. 2 taken along the line 5-5 of FIG. 2;
- FIG. 6 is a partial, sectional view of a bicycle control device according to another embodiment;
- FIG. 7 is a partial, sectional view of another bicycle control device according to still another embodiment;
- FIG. 8 is a partial, exploded sectional view of a grip cover according to another embodiment;
- FIG. 9 is a view of the grip cover similar to that shown in FIG. 8, except that a tab is coupled to a low durometer portion;
- FIG. 10 is a right side elevational view of a bicycle control device according to another embodiment;
- FIG. 11 is a sectional view of the bicycle control device of FIG. 10 taken along the line 11-11 of FIG. 10;
- FIG. 12 is a right side elevational view of a bicycle control device according to another embodiment;
- FIG. 13 is a sectional view of the bicycle control device of FIG. 12 taken along the line 13-13 of FIG. 12;
- FIG. 14 is a right side elevational view of a housing of a bicycle control device according to another embodiment;
- FIG. 15 is a right side elevational view of a grip cover configured to engage the housing of FIG. 14;
- FIG. 16 is an exploded schematic sectional view of

the housing of FIG. 14 and the grip cover of FIG. 15;

- FIG. 17 is a schematic sectional view of the housing of FIG. 14 and the grip cover of FIG. 15 in a combined state;
- FIG. 18 is a sectional view of a transition area of the grip cover of FIG. 4;
- FIG. 19 is a sectional view of a transition area of a grip cover according to another embodiment; and
- FIG. 20 is a sectional view of a transition area of a grip cover according to still another embodiment.

[0006] Other aspects and advantages of the embodiments disclosed herein will become apparent upon consideration of the following detailed description, wherein similar or identical structures have similar reference numerals.

25 DETAILED DESCRIPTION

[0007] With reference to the disclosure herein, a grip for a bicycle control device is described. One exemplary handlebar-steered bicycle 20 is depicted in FIG. 1. However, the present disclosure is practicable with other bicycles and other handlebar-steerable vehicles, as desired. The bicycle 20 generally includes a frame 22 supported on a front wheel 24 and a rear wheel 26. A drivetrain 28 is arranged to provide power to the rear wheel 26. A front brake 30 and a rear brake 32 are arranged to slow rotation of the front wheel 24 and the rear wheel 26, respectively. A saddle 34 is provided for use by a rider. Further, a handlebar assembly 36 is arranged to control the direction of the front wheel 24 and communicate with the drivetrain 28, the front brake 30, and the rear brake 32 to control operation thereof.

[0008] It is to be understood that the specific arrangement and illustrated components of the frame 22, front wheel 24, rear wheel 26, drivetrain 28, front brake 30, rear brake 32, and saddle 34 are nonlimiting to the disclosed embodiments. For example, while the front brake 30 and the rear brake 32 are illustrated as hydraulic rim brakes, hydraulic disc brakes are contemplated and encompassed within the scope of the disclosure. Additionally, mechanical brake systems including mechanical rim brakes and mechanical disk brakes are contemplated and encompassed within the scope of the present disclosure.

[0009] The handlebar assembly 36 includes a handlebar 38, a right bicycle control device 40, and a left bicycle control device (not shown). Typically, the right bicycle control device 40 controls operation of a rear derailleur 42 (part of the drivetrain 28) and the rear brake 32 while

the left bicycle control device controls a front derailleur 44 (part of the drivetrain 28) and the front brake 30. The illustrated handlebar 38 is a drop-style handlebar. In other embodiments, different handlebar styles may be employed (e.g., bullhorn, flat, riser, etc.), as desired.

[0010] FIG. 2 shows the right bicycle control device 40 attached to the handlebar 38. The right bicycle control device 40 includes a housing 46 (e.g., a shifter body) that has first and second ends 48, 50. The housing 46 includes a handlebar mounting portion 52 at the first end 48, a horn portion 54 at the second end 50, and a gripping portion 56 arranged between the handlebar mounting portion 52 and the horn portion 54. The handlebar mounting portion 52 supports a clamp or clasp 58 used to fasten the right bicycle control device 40 to the handlebar 38. In this embodiment, a shift lever 60 and a brake lever 62 are coupled to the housing 46, and interact with the rear derailleur 42 and the rear brake 32, respectively. In this embodiment, the left bicycle control device (not shown) is substantially identical and includes similar structure to attach to the handlebar 38 and shift and brake levers to interact with the front derailleur 44 and the front brake 30, respectively. In other embodiments the left and right bicycle control devices may interact with different combinations of bicycle components. For purposes of simplicity, the right bicycle control device 40 will be discussed, however, the structural and functional aspects of the remainder of the device 40 are applicable and relevant to the left bicycle control device.

[0011] A grip cover 64 (e.g., a shifter cover, a hood cover, etc.) is disposed over at least portions of the gripping portion 56, and may be disposed over at least part of the horn portion 54, to provide a cushion or an ergonomic gripping surface for a user. The grip cover 64 is removable from the housing 46. The removal of the grip cover 64 may be to provide access to internal components of the right bicycle control device 40, or to replace the grip cover 64. The grip cover 64 includes a first or high durometer portion. The high durometer portion includes an attachment mechanism 66, such as a snap tab which may include toolless connection such as snap protrusions and/or other components to secure or attach the grip cover 64 to the housing 46. The attachment mechanism 66 may also involve tool based attachment, such as with a screw as is illustrated with reference to FIG. 7. The attachment mechanism 66, or components thereof, allows the grip cover 64 to removably engage the housing 46. In an embodiment, the attachment mechanism 66 is formed of a same or similar high durometer material as the high durometer portion of the grip cover 64. The grip cover 64 also includes a second or low durometer portion 68. The grip cover 64 further defines a transition area 70 that extends between the first end 48 of the housing 46 and the handlebar 38. As used herein, relative durometer portions (e.g. high and low) are general references to durometer scales. For example, the American Society for Testing and Materials ("ASTM") standard D2240 type A, type D, and/or type OO scales may be used to measure

relative or specific durometer values. Other scale may also be used, such as the ASTM type B or type C scales.

[0012] The high durometer portion and the low durometer portions of the grip cover may be connected or otherwise attached using any technique. For example, co-molding, co-bonding, and/or other techniques may be used. The high durometer portion and the low durometer portions may also be attached using mechanical techniques, such as is described with respect to FIGS. 8 and 9.

[0013] The grip cover 64 advantageously provides a tight-fitting relationship to the housing 46. Grip cover designs may use a soft durometer material to interlock with housings, resulting in an undesirable fit and finish. For example, thermoplastic elastomers or silicone are typical materials that are used and have a durometer of about 50 Shore A. Usage and aggressive riding conditions can cause the grip covers to creep and twist on the housings because of the softness of the material. FIG. 3 shows the housing 46 with the grip cover 64, the shift lever 60, and the brake lever 62 removed for clarity. The housing 46 includes a grip engaging feature in the form of a recess 72 and a grip shoulder 74. While FIG. 3 shows a right side of the housing 46, the left side of the housing 46 may include a retention receptacle in the form of a recess 72, and/or grip shoulder 74. The grip shoulder 74 may be continuous, wrapping around the entire housing 46. The grip shoulder 74 defines a grip/housing interface profile where the grip cover 64 abuts the housing 46. The grip/housing interface profile provides a substantially flush transition from the grip cover 64 to the housing 46 to provide a comfortable gripping surface. In one embodiment, the housing 46 is constructed of carbon fiber nylon composite or a glass filled nylon composite having a durometer of about 85 Shore D. In other embodiments, the housing 46 is constructed from a material having a durometer of between about 55 and about 85 Shore D, as desired.

[0014] Turning to FIG. 4, an embodiment of the grip cover 64 is shown removed from the housing 46. The attachment mechanism 66 is a high durometer portion of the grip cover 64. The attachment mechanism 66, such as a snap tab, includes a grip cover projection 76 sized to engage surfaces defining a snap recess 72. The attachment mechanism 66 includes a snap tab edge 78 that is shaped to engage a portion of the grip shoulder 74 and match the corresponding portion of the grip/housing interface profile to provide a smooth transition (see FIG. 5). While FIG. 4 shows a right side of the grip cover 64, the left side of the grip cover 64 also includes an attachment mechanism 66 that is arranged to engage the left side of the housing 46. In one embodiment, the attachment mechanism 66 is formed of a first material (e.g., Acrylonitrile butadiene styrene or ABS) having a durometer of about 75 Shore D. In other embodiments, the attachment mechanism 66 is constructed from a material having a durometer of between about 30 and about 85 Shore D, as desired.

[0015] Still referring to FIG. 4, the low durometer portion 68 defines a low durometer edge 80 that is shaped to engage a portion of the grip shoulder 74 and match the corresponding portion of the grip/housing interface profile to provide a smooth transition. In one embodiment, the low durometer portion 68 is formed of a second material (e.g., thermoplastic polyurethane) having a durometer of about 50 Shore A. In other embodiments, the low durometer portion 68 is constructed from a material having a durometer of between about 30 and about 70 Shore A, as desired.

[0016] The transition area 70 may be constructed of the same material as the low durometer portion 68 and is sized to envelop the housing 46 at the first end 48 and provide a transition to the handlebar 38. The low durometer portion 68 extends over the housing 46. In one embodiment, the transition area 70 is sized such that a tension is applied to the low durometer material when the grip cover 64 is installed on the housing 46. For example, uninstalled (i.e. untensioned) dimensions of the grip cover 64 may be different than installed (i.e. tensioned) dimensions of the grip cover 64 as the low durometer portion 68 of the grip cover 64 is stretched over the housing 46, and secured to the housing 46 with the high durometer portion of the grip cover 64.

[0017] Turning to FIG. 5, one embodiment of the grip cover 64 is shown with the attachment mechanism 66 comolded to the low durometer portion 68 at a union in the form of a comolding joint 82. In other words, the attachment mechanism 66 is joined to the low durometer portion 68 during a molding process such that the grip cover 64, when formed, is a single piece. Further, the grip cover projection 76 includes a projection retention mechanism in the form of a projection or hooking tab 84 extending from the projection 76 and shaped to be received in a recess 86 formed within the snap recess 72.

[0018] Assembly of the grip cover 64 onto the housing 46 will be described below with reference to FIG. 2. The transition area 70 is first passed over the brake lever 62 and the shift lever 60, and onto the housing 46. The transition portion 70 is then stretched over the horn portion 54 and the gripping portion 56 until the transition area 70 is stretched over the second end 50 of the housing 46 and creates a desirable transition to the handlebar 38. The attachment mechanisms 66 are then pulled into place and the grip cover projections 76 are inserted or otherwise attached into the snap recesses 72 formed in the housing 46 such that the tab edge 78 is abutted with the grip shoulder 74 formed in the housing 46. Engagement of the attachment mechanism 66 with the snap recesses 72 applies a tension to the low durometer portion 68 in the direction shown by lines A and brings the low durometer edge 80 into abutment with the grip shoulder 74 of the housing 46 such that a smooth gripping surface is provided around the right bicycle control device 40. The low durometer portion 68 is stretched across or over the housing 46 such that the low durometer portion 68 is in contact with the housing 46 and is inhibited from mov-

ing relative to the housing 46. The tension caused by the stretching causes a slight longitudinal deformation of the low durometer portion 68 at least in the directions shown by lines A and increases the resistance of the low durometer portion 68 to further stretching and deformation.

[0019] In operation, the user is provided with a cushioned gripping surface by the low durometer portion 68 while the attachment mechanisms 66 provide a secure connection to the housing 46 and reduce bagginess and twist relative to the housing 46 during use. The grip cover 64 also provides a securely connected gripping surface while leaving a portion 87 of the housing 46 exposed (see, for example, FIG. 2), thereby providing the ability to access a battery of an electronic shifting system or another component without the necessity of removing the grip cover 64. The attachment mechanisms 66 provide for easy assembly and replacement of the grip covers 64 with less stretching and pulling required as compared to typical grip covers. Additionally, because the attachment mechanisms 66 interact with the snap recesses 72, the placement of the grip cover 64 on the housing 46 is easier than with typical grip covers, resulting in more consistent and visually pleasing installations. The transition area 70 is arranged to provide a smooth transition to grip tape applied to the handlebar 38, or a handlebar 38 with no grip tape applied, such that the user enjoys a continuous and improved gripping surface from the handlebar 38 to the horn portion 54.

[0020] FIG. 6 shows an alternative grip cover 164 and housing 146 that are similar to the grip cover 64 and housing 46, respectively, described above, wherein like parts will be noted with similar numerals. The grip cover 164 includes a snap projection 176 and a snap retention mechanism in the form of a groove 88 sized to receive a snap, or retaining, ring 90. The snap recess 172 defines a through hole sized to receive the snap projection 176. In operation, the user inserts the snap projection 176 into the snap recess 172 and the snap, or retaining, ring 90 is engaged with surfaces defining the groove 88 to maintain the grip cover 164 in position relative to the housing 146.

[0021] FIG. 7 shows an alternative grip cover 264 and housing 246 that are similar to the grip cover 64 and housing 46, respectively, described above, wherein like parts will be noted with similar numerals. The grip cover 264 includes a projection 276 and a retention mechanism in the form of a through hole 92 sized to receive a fastener in the form of a screw 94. The recess 272 includes a fastener aperture 96 sized to receive the screw 94. In operation, the user inserts the projection 276 into the recess 272 and the screw 94 is passed through the through hole 92 and engaged with surfaces defining the fastener aperture 96 to maintain the grip cover 264 in position relative to the housing 246.

[0022] FIGS. 8 and 9 show an alternative grip cover 364 that is similar to the grip cover 64 described above. The low durometer portion 368 of the grip cover 364 is not comolded to the high durometer portion that includes

the snap tabs 366, but is rather mechanically connected thereto. The low durometer portion 368 defines a coupling aperture 98 and the snap tab 366 includes a coupling projection 100 sized to engage surfaces defining the coupling aperture 98 and connect the snap tab 366 to the low durometer portion 368. In one embodiment, the low durometer portion includes multiple coupling apertures 98 and multiple coupling projections 100 that interact to connect the snap tab 366 to the low durometer portion 368. In operation, the snap tab 366 is engaged with the low durometer portion 368 ahead of installation onto the housing 46. In other embodiments, the high durometer portion includes a press fit snap or a molder zipper.

[0023] FIGS. 10 and 11 are directed to a right bicycle control device 440 that is similar to the right bicycle control device 40 discussed above, wherein like components are identified with similar numerals. The grip cover 464 includes a high durometer portion that includes an attachment mechanism having an interlocking slide 102 shaped to be received within a retention receptacle in the form of a groove or sliding track 104 provided in the housing 446. As is clearly shown in FIG. 11, the low durometer portion 468 is comolded to the interlocking slide 102. In another embodiment, the interlocking slide 102 may mechanically couple with the low durometer portion 486. The illustrated interlocking slide 102 provides a generally hook shaped cross section.

[0024] In other embodiments, the interlocking slide 102 and corresponding sliding track 104 may define a captured profile, such that the interlocking slide 102 cannot exit the sliding track 104 in a direction perpendicular to a sliding direction B. In operation, the grip cover 464 is installed by interlocking the interlocking slide 102 with the sliding track 104 and sliding the interlocking slide 102 in the direction B until the grip cover 464 is positioned as desired.

[0025] FIGS. 12 and 13 are directed to a right bicycle control device 540 that is similar to the right bicycle control device 40 discussed above, wherein like components are identified with similar numerals. The grip cover 564 includes a high durometer portion in the form of a concealed rigid shell 106 that includes projections 108 arranged to be received in retention receptacles. The grip cover 564 also includes a grip shoulder 474 and an edge 480 to a low durometer portion. In the present embodiment, the retention receptacles comprise recesses 110 formed in the housing 546 corresponding to the projections 108. The low durometer portion 568 is comolded over the top of the concealed rigid shell 2106. In operation, the grip cover 564 is pressed onto the housing 546 until the projections 108 of the concealed rigid shell 106 snap into the recesses 110 to hold the grip cover 564 in place relative to the housing 546 without the use of additional fasteners or sliding undercuts.

[0026] FIGS. 14-17 are directed to a housing 646 and a grip cover 664 that are similar to the housing 46 and the grip cover 64 discussed above, wherein like compo-

nents are identified with similar numerals. The grip cover 664 includes a high durometer portion in the form of a plurality of concealed snaps 112 and concealed ribs 114 arranged to be received within a retention receptacle in the form of corresponding snap recesses 116 and rib recesses 118, respectively. In operation, the grip cover 664 is assembled similarly to the grip cover 64 by pulling the transition area 670 onto the housing first, then engaging the concealed snaps 112 with the snap recesses 116 and the concealed ribs 114 with the rib recesses 118 as shown in FIGS. 16 and 17. In another embodiment, the arrangement of concealed snaps 112 and concealed ribs 114 could be combined with other embodiments. For example, the concealed snaps 112 and concealed ribs 114 could extend from the concealed rigid shell 106 discussed above. Alternatively, the concealed snaps 112 and concealed ribs 114 could be constructed of the low durometer material and be used in conjunction with another high durometer portion including an attachment mechanism, such as snap tabs, for example.

[0027] Turning now to FIG. 18, the transition area 70 is shown in cross section, which provides a continuous annular surface that contacts and surrounds a housing. FIG. 19 shows another embodiment where a transition area 721 includes a seam 723 that allows two high durometer portions in the form of interlocking slides 725 to come apart. The interlocking slides 725 could engage a housing arranged to receive the interlocking slides 725 to hold the transition area 721 in place when installed onto a right bicycle control device. FIG. 20 shows another embodiment where a transition area 821 includes a zipper 829 that can be opened and closed to aid installation of the grip cover.

[0028] In an embodiment, a grip cover for a bicycle control device includes a high durometer portion comprising an attachment mechanism configured to engage the bicycle control device to maintain the grip cover in contact with the bicycle control device. The grip cover also includes a low durometer portion connected to the high durometer portion, the low durometer portion dimensioned to extend over the bicycle control device. The low durometer portion may be configured to be tensioned by the high durometer portion when the grip cover is installed on the bicycle control device. The high durometer portion may define a durometer of between about 30 and about 85 Shore D, and the low durometer portion may define a durometer of between about 30 and about 70 Shore A. For example, the low durometer portion may define a durometer of about 50 Shore A and the high durometer portion may define a durometer of about 75 Shore D. The high durometer portion may be constructed of acrylonitrile butadiene styrene, and the low durometer portion may be constructed of thermoplastic polyurethane. The attachment mechanism may involve tooled or toolless attachment to the bicycle control device. The attachment mechanism of the high durometer portion may include one or more projections configured to engage the bicycle control device. The projection may include a tab and/or

a groove and a retaining ring engagable with surfaces defining the groove to maintain the grip cover installed on the bicycle control device. The projection may include a through hole sized to receive a fastener that passes through the through hole and is configured to engage the bicycle control device. The attachment mechanism of the high durometer portion may include an interlocking slide configured to engage the bicycle control device. The attachment mechanism of the high durometer portion includes a concealed shell configured to engage the bicycle control device. The attachment mechanism of the high durometer portion may include a concealed snap configured to engage the bicycle control device. The attachment mechanism of the high durometer portion may include a concealed rib configured to engage the bicycle control device. The attachment mechanism of the high durometer portion may include a zipper. The low durometer portion and the high durometer portion are coupled. For example, the low durometer portion and the high durometer portion may be comolded and/or mechanically coupled.

[0029] In an embodiment, a grip cover for a bicycle control device includes a low durometer portion defining a durometer of less than about 70 Shore A and configured to be stretched across the bicycle control device. The low durometer portion may define a durometer of between about 30 and about 70 Shore A, for example 50 shore A. The low durometer portion may be constructed of thermoplastic polyurethane.

[0030] In an embodiment, a bicycle control device comprising includes a housing having a retention receptacle and a lever coupled to the housing. The bicycle control device also includes a grip cover coupled to the housing and including a first portion and a second portion, wherein the first portion has a durometer value greater than the second portion, wherein the first portion engages the retention receptacle to maintain the grip cover on the housing, and wherein the second portion is connected to the first portion and extends over the housing. The retention receptacle may include a recess, and the first portion may include an attachment mechanism configured to be received within the recess. The attachment mechanism may include a projection sized to be received within the recess. The attachment mechanism may include the projection and a hooking tab extending from the projection and sized to be received within the recess. The attachment mechanism may include a projection and a groove formed on the projection. The projection may be sized to be received within the recess, and may further include a retaining ring engagable with surfaces defining the groove to maintain the projection within the recess. The attachment mechanism may include a projection sized to be received within the recess, and may further include a fastener passing through the projection and engaging the housing. The retention receptacle may include a slide track, and the first portion may include an interlocking slide sized to be slidably received within the slide track. The retention receptacle may include a plurality of re-

cesses, and the first portion may include a plurality of projections received in the plurality of recesses. The first portion may include a concealed shell. The retention receptacle may include a plurality of projection recesses and a plurality of rib recesses, and the first portion may include an attachment mechanism comprising a plurality of concealed projections sized to be received within the plurality of projection recesses and a plurality of concealed ribs sized to be received within the plurality of rib recesses. The second portion may include a transition area that annularly surrounds the housing. The second portion may define a durometer of between about 30 and about 70 Shore A, and/or the first portion may define a durometer of between about 30 and about 85 Shore D. The first portion may be constructed of acrylonitrile butadiene styrene, and the second portion may be constructed of thermoplastic polyurethane. The second portion and the first portion may be comolded.

[0031] Numerous modifications to the embodiments disclosed herein will be apparent to those skilled in the art in view of the foregoing description. For example, any of the embodiments disclosed herein may be modified to include any of the structures and/or methodologies disclosed in connection with different embodiments. Accordingly, this disclosure is to be construed as illustrative only and is presented for the purpose of enabling those skilled in the art to make and use the invention and to teach the best mode of carrying out same. The exclusive rights to all modifications which come within the scope of the appended claims are reserved.

Claims

1. A bicycle control device (40, 440) comprising:

a housing (46, 146, 246, 446, 646) including a retention receptacle;
a lever (60, 62) coupled to the housing (46, 146, 246, 446, 646); and
a grip cover (64, 164, 264, 464, 664) coupled to the housing (46, 146, 246, 446, 646);

characterized in that

the grip cover (64, 164, 264, 464, 664) includes a first portion and a second portion (68), wherein the first portion has a durometer value greater than the second portion (68), wherein the first portion engages the retention receptacle to maintain the grip cover (64, 164, 264, 464, 664) on the housing (46, 146, 246, 446, 646), and wherein the second portion (68) is connected to the first portion and extends over the housing (46, 146, 246, 446, 646), wherein the retention receptacle includes a recess (72, 172, 272, 116, 118), and the first portion of the grip cover (64, 164, 264, 664) includes an attachment mechanism (66) configured to be received within the recess (72, 172, 272, 116, 118).

2. The bicycle control device (40, 440) of claim 1, wherein the second portion (68) of the grip cover (64, 164, 264, 464, 646) is configured to be tensioned by the first portion of the grip cover (64, 164, 264, 464, 664)
3. The bicycle control device (40, 440) of claim 1 or 2, wherein the first portion of the grip cover (64, 164, 264, 464, 664) defines a durometer of between about 30 and about 85 Shore D, and the second portion (68) of the grip cover (64, 164, 264, 464, 664) defines a durometer of between about 30 and about 70 Shore A, and/or wherein the second portion (68) of the grip cover (64, 164, 264, 464, 664) defines a durometer of about 50 Shore A, wherein, optionally, the first portion of the grip cover (64, 164, 264, 464, 664) defines a durometer of about 75 Shore D.
4. The bicycle control device (40, 440) of one of the preceding claims, wherein the first portion of the grip cover (64, 164, 264, 464, 664) is constructed of acrylonitrile butadiene styrene, and/or wherein the second portion (68) of the grip cover (64, 164, 264, 464, 664) is constructed of thermoplastic polyurethane.
5. The bicycle control device (40) of one of the preceding claims, wherein, the attachment mechanism (66) includes a projection (76, 176, 276, 112, 114) sized to be received within the recess (72, 172, 272, 116, 118), wherein, preferably, the attachment mechanism (66) includes the projection (76) and a hooking tab (78) extending from the projection (76) and sized to be received within the recess (72).
6. The bicycle control device (40) of one the preceding claims, wherein the attachment mechanism (66) includes:
- a first projection (176) and a groove (88) formed on the first projection (176), the first projection (176) sized to be received within the recess (172), and further comprising a retaining ring (90) engagable with surfaces defining the groove (88) to maintain the first projection (176) within the recess (172), and/or
 - a second projection (276) sized to be received within the recess (272), and further comprising a fastener (94) passing through the second projection and engaging the housing (246).
7. The bicycle control device (40) of claim 6, wherein the second projection (276) includes a through hole (92) sized to receive the fastener (94) that passes through the through hole (92) and is configured to engage the bicycle control device (40).
8. The bicycle control device (40, 440) of one of the preceding claims, wherein the retention receptacle

includes:

- a slide track (104), and the first portion of the grip cover (464) includes an interlocking slide (102) sized to be slidably received within the slide track (104), and/or
- a plurality of recesses (72), and the first portion of the grip cover (64) includes a plurality of projections (76) received in the plurality of recesses (72), and/or
- a plurality of projection recesses (116) and a plurality of rib recesses (118), and wherein the first portion of the grip cover (664) includes an attachment mechanism comprising a plurality of concealed projections (112) sized to be received within the plurality of projection recesses (116) and a plurality of concealed ribs (114) sized to be received within the plurality of rib recesses (118).

9. The bicycle control device (40, 440) of one of the preceding claims, wherein the second portion (68) of the grip cover (64, 164, 264, 464, 664) and the first portion of the grip cover (64, 164, 264, 464, 664) are comolded, or wherein the second portion (68) of the grip cover (64, 164, 264, 464, 664) and the first portion of the grip cover (64, 164, 264, 464, 664) are mechanically coupled.

Patentansprüche

1. Fahrrad-Steuvorrichtung (40, 440), umfassend:

ein Gehäuse (46, 146, 246, 446, 646), die eine Rückhalteaufnahme umfasst;
einen Hebel (60, 62), der mit dem Gehäuse (46, 146, 246, 446, 646) gekoppelt ist; und
eine Griffabdeckung (64, 164, 264, 464, 664), die mit dem Gehäuse (46, 146, 246, 446, 646) gekoppelt ist;

dadurch gekennzeichnet, dass

die Griffabdeckung (64, 164, 264, 464, 664) einen ersten Teil und einen zweiten Teil (68) umfasst, wobei der erste Teil einen größeren Härtewert aufweist als der zweite Teil (68), wobei der erste Teil in die Rückhalteaufnahme eingreift, um die Griffabdeckung (64, 164, 264, 464, 664) am Gehäuse (46, 146, 246, 446, 646) zu halten, und wobei der zweite Teil (68) mit dem ersten Teil verbunden ist und sich über das Gehäuse (46, 146, 246, 446, 646) erstreckt, wobei die Rückhalteaufnahme eine Aussparung (72, 172, 272, 116, 118) umfasst, und der erste Teil der Griffabdeckung (64, 164, 264, 664) einen Befestigungsmechanismus (66) umfasst, der so konfiguriert ist, dass er in der Aussparung (72, 172, 272, 116, 118) aufgenommen wird.

2. Fahrrad-Steuervorrichtung nach Anspruch 1, wobei der zweite Teil (68) der Griffabdeckung (64, 164, 264, 464, 664) so konfiguriert ist, dass er durch den ersten Teil der Griffabdeckung (64, 164, 264, 464, 664) gespannt wird. 5
3. Fahrrad-Steuervorrichtung (40, 440) nach Anspruch 1 oder 2, wobei der erste Teil der Griffabdeckung (64, 164, 264, 464, 664) eine Shore-D-Härte zwischen etwa 30 und etwa 85 und der zweite Teil (68) der Griffabdeckung (64, 164, 264, 464, 664) eine Shore-A-Härte zwischen etwa 30 und etwa 70 definiert, und/oder wobei der zweite Teil (68) der Griffabdeckung (64, 164, 264, 464, 664) ein Shore-A-Härte von etwa 50 definiert, wobei optional der erste Teil der Griffabdeckung (64, 164, 264, 464, 664) eine Shore-D-Härte von etwa 75 definiert. 10
4. Fahrrad-Steuervorrichtung (40, 440) nach einem der vorhergehenden Ansprüche, wobei der erste Teil der Griffabdeckung (64, 164, 264, 464, 664) aus Acrylnitril-Butadien-Styrol hergestellt ist, und/oder wobei der zweite Teil (68) der Griffabdeckung (64, 164, 264, 464, 664) aus thermoplastischem Polyurethan hergestellt ist. 20
5. Fahrrad-Steuervorrichtung (40) nach einem der vorhergehenden Ansprüche, wobei der Befestigungsmechanismus (66) einen Vorsprung (76, 176, 276, 112, 114) umfasst, der so bemessen ist, dass er in der Aussparung (72, 172, 272, 116, 118) aufgenommen wird, wobei bevorzugt der Befestigungsmechanismus (66) den Vorsprung (76) und eine Einhaklasche (78) umfasst, die sich von dem Vorsprung (76) weg erstreckt und so bemessen ist, dass sie in der Aussparung (72) aufgenommen wird. 30
6. Fahrrad-Steuervorrichtung (40) nach einem der vorhergehenden Ansprüche, wobei der Befestigungsmechanismus (66) umfasst: 40
- einen ersten Vorsprung (176) und eine auf dem ersten Vorsprung (176) ausgebildete Nut (88), wobei der erste Vorsprung (176) so bemessen ist, dass er in der Aussparung (172) aufgenommen wird, und ferner einen Haltering (90) umfasst, der mit die Nut (88) definierenden Flächen in Eingriff gebracht werden kann, um den ersten Vorsprung (176) innerhalb der Aussparung (172) zu halten, und/oder 50
 - einen zweiten Vorsprung (276), der so bemessen ist, dass er in der Aussparung (272) aufgenommen wird, und ferner ein Befestigungselement (94) umfasst, das durch den zweiten Vorsprung verläuft und in das Gehäuse (246) eingreift. 55
7. Fahrrad-Steuervorrichtung (40) nach Anspruch 6, wobei der zweite Vorsprung (276) ein Durchgangsloch (92) umfasst, das so bemessen ist, dass es das Befestigungselement (94) aufnimmt, das durch das Durchgangsloch (92) verläuft und zum Eingreifen in die Fahrradsteuervorrichtung (40) konfiguriert ist.
8. Fahrrad-Steuervorrichtung (40, 440) nach einem der vorhergehenden Ansprüche, wobei die Rückhalteaufnahme umfasst:
- eine Gleitbahn (104), und der erste Teil der Griffabdeckung (464) umfasst ein formschlüssiges Gleitstück (102), das so bemessen ist, dass es gleitend in der Gleitbahn (104) aufgenommen wird, und/oder
 - eine Mehrzahl von Aussparungen (72), und der erste Teil der Griffabdeckung (64) umfasst eine in der Mehrzahl von Aussparungen (72) aufgenommene Mehrzahl von Vorsprüngen (76), und/oder
 - eine Mehrzahl von Vorsprungsaussparungen (116) und eine Mehrzahl von Rippenaussparungen (118), und wobei der erste Teil der Griffabdeckung (664) einen Befestigungsmechanismus umfasst, der eine Mehrzahl von verdeckten Vorsprüngen (112) umfasst, die so bemessen sind, dass sie in der Mehrzahl von Vorsprungsaussparungen (116) aufgenommen werden, und eine Mehrzahl von verdeckten Rippen (114), die so bemessen sind, dass sie in der Mehrzahl von Rippenaussparungen (118) aufgenommen werden.
9. Fahrrad-Steuervorrichtung (40, 440) nach einem der vorhergehenden Ansprüche, wobei der zweite Teil (68) der Griffabdeckung (64, 164, 264, 464, 664) und der erste Teil der Griffabdeckung (64, 164, 264, 464, 664) zusammen ausgeformt sind, oder wobei der zweite Teil (68) der Griffabdeckung (64, 164, 264, 464, 664) und der erste Teil der Griffabdeckung (64, 164, 264, 464, 664) mechanisch gekoppelt sind.
- Revendications**
1. Dispositif de commande de vélo (40, 440) comprenant :
- un boîtier (46, 146, 246, 446, 646) contenant un réceptacle de retenue ;
 - un levier (60, 62) couplé au boîtier (46, 146, 246, 446, 646) ; et
 - un couvre-poignée (64, 164, 264, 464, 664) couplé au boîtier (46, 146, 246, 446, 646) ;
- caractérisé par le fait que**
le couvre-poignée (64, 164, 264, 464, 664) com-

- prend une première partie et une seconde partie (68), la première partie ayant une valeur de duromètre supérieure à la seconde partie (68), la première partie engageant le réceptacle de retenue pour maintenir le couvre-poignée (64, 164, 264, 464, 664) sur le boîtier (46, 146, 246, 446, 646), et la seconde partie (68) étant reliée à la première partie et s'étendant sur le boîtier (46, 146, 246, 446, 646), le réceptacle de retenue comprenant un évidement (72, 172, 272, 116, 118), et la première partie du couvre-poignée (64, 164, 264, 664) comprenant un mécanisme de fixation (66) configuré pour être reçu à l'intérieur de l'évidement (72, 172, 272, 116, 118).
2. Dispositif de commande de vélo (40, 440) selon la revendication 1, dans lequel la seconde partie (68) du couvre-poignée (64, 164, 264, 464, 664) est configurée pour être tendue par la première partie du couvre-poignée (64, 164, 264, 464, 664).
 3. Dispositif de commande de vélo (40, 440) selon la revendication 1 ou 2, dans lequel la première partie du couvre-poignée (64, 164, 264, 464, 664) définit un duromètre compris entre environ 30 et environ 85 Shore D, et la seconde partie (68) du couvre-poignée (64, 164, 264, 464, 664) définit un duromètre compris entre environ 30 et environ 70 Shore A, et/ou dans lequel la seconde partie (68) du couvre-poignée (64, 164, 264, 464, 664) définit un duromètre d'environ 50 Shore A, la première partie du couvre-poignée (64, 164, 264, 464, 664) définissant facultativement un duromètre d'environ 75 Shore D.
 4. Dispositif de commande de vélo (40, 440) selon l'une des revendications précédentes, dans lequel la première partie du couvre-poignée (64, 164, 264, 464, 664) est faite d'acrylonitrile butadiène styrène, et/ou dans lequel la seconde partie (68) du couvre-poignée (64, 164, 264, 464, 664) est faite de polyuréthane thermoplastique.
 5. Dispositif de commande de vélo (40) selon l'une des revendications précédentes, dans lequel le mécanisme de fixation (66) comprend une saillie (76, 176, 276, 112, 114) dimensionnée pour être reçue à l'intérieur de l'évidement (72, 172, 272, 116, 118), le mécanisme de fixation (66) comprenant, de préférence, la saillie (76) et une patte d'accrochage (78) s'étendant à partir de la saillie (76) et dimensionnée pour être reçue à l'intérieur de l'évidement (72).
 6. Dispositif de commande de vélo (40) selon l'une des revendications précédentes, dans lequel le mécanisme de fixation (66) comprend :
 - une première saillie (176) et une rainure (88) formée sur la première saillie (176), la première saillie (176) étant dimensionnée pour être reçue
 7. Dispositif de commande de vélo (40) selon la revendication 6, dans lequel la seconde saillie (276) comprend un trou traversant (92) dimensionné pour recevoir l'organe de fixation (94) qui passe à travers le trou traversant (92) et est configuré pour engager le dispositif de commande de vélo (40).
 8. Dispositif de commande de vélo (40, 440) selon l'une des revendications précédentes, dans lequel le réceptacle de retenue comprend :
 - un chemin de coulissement (104), et la première partie du couvre-poignée (464) comprend un coulisseau de verrouillage (102) dimensionné pour être reçu de manière coulissante à l'intérieur du chemin de coulissement (104), et/ou
 - une pluralité d'évidements (72), et la première partie du couvre-poignée (64) comprend une pluralité de saillies (76) reçues dans la pluralité d'évidements (72), et/ou
 - une pluralité d'évidements de saillie (116) et une pluralité d'évidements de nervure (118), et la première partie du couvre-poignée (664) comprenant un mécanisme de fixation comprenant une pluralité de saillies dissimulées (112) dimensionnées pour être reçues à l'intérieur de la pluralité d'évidements de saillie (116) et une pluralité de nervures dissimulées (114) dimensionnées pour être reçues à l'intérieur de la pluralité d'évidements de nervure (118).
 9. Dispositif de commande de vélo (40, 440) selon l'une des revendications précédentes, dans lequel la seconde partie (68) du couvre-poignée (64, 164, 264, 464, 664) et la première partie du couvre-poignée (64, 164, 264, 464, 664) sont co-moulées, ou dans lequel la seconde partie du couvre-poignée (64, 164, 264, 464, 664) et la première partie du couvre-poignée (64, 164, 264, 464, 664) sont couplées mécaniquement.
- à l'intérieur de l'évidement (172), et comprenant en outre une bague de retenue (90) apte à s'engager avec des surfaces définissant la rainure (88) pour maintenir la première saillie (176) à l'intérieur de l'évidement (172), et/ou
- une seconde saillie (276) dimensionnée pour être reçue à l'intérieur de l'évidement (272), et comprenant en outre un organe de fixation (94) passant à travers la seconde saillie et engageant le boîtier (246).

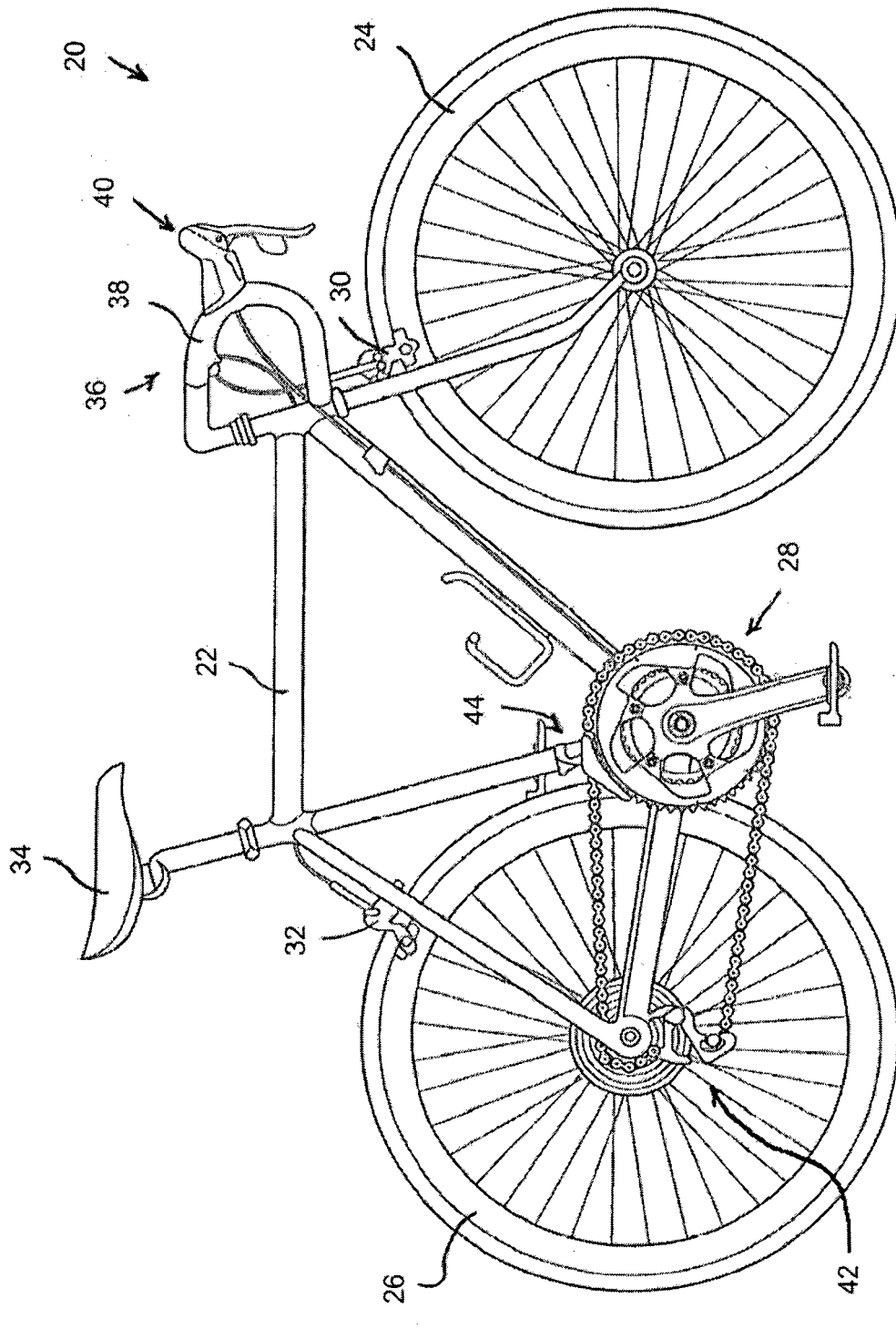


FIG. 1

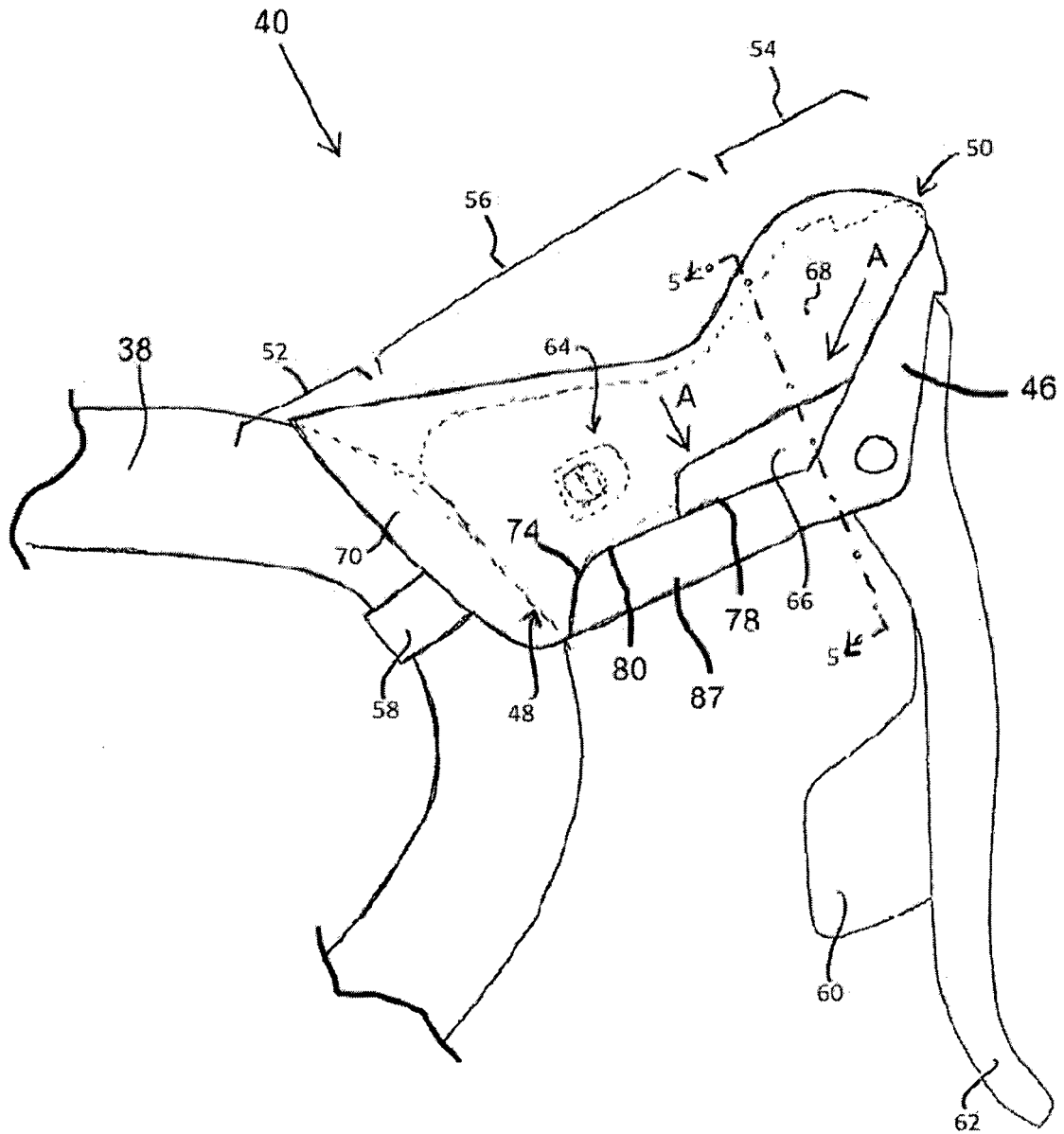


FIG. 2

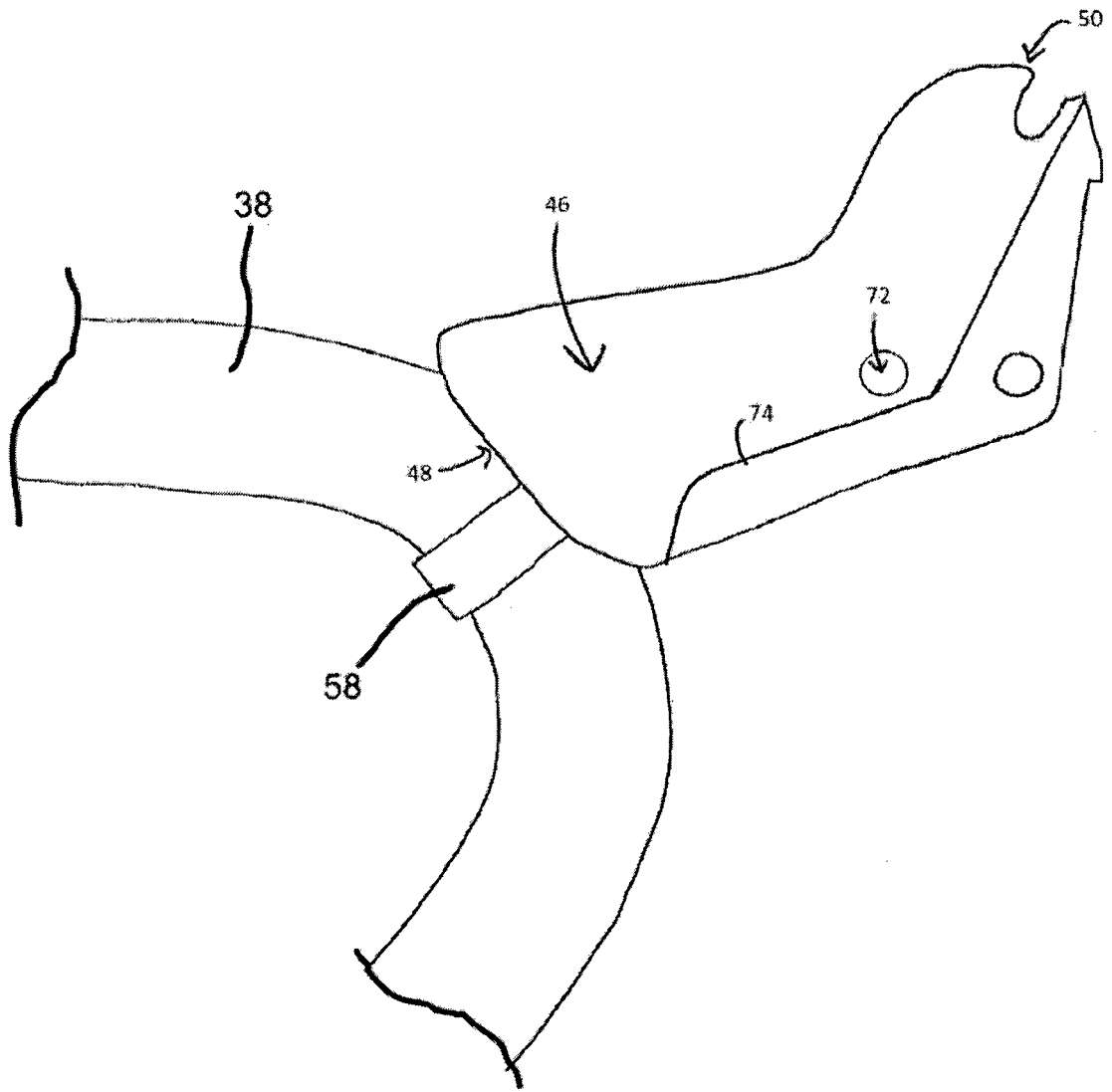


FIG. 3

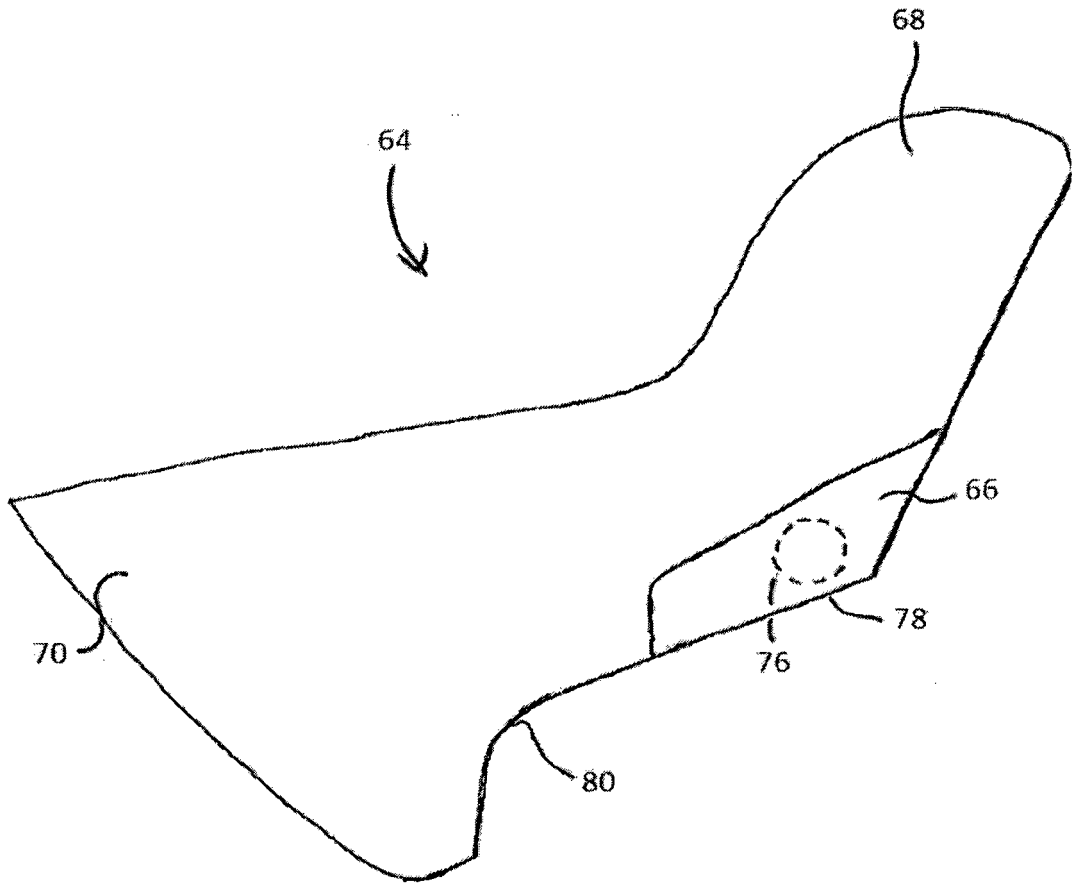


FIG. 4

FIG. 5

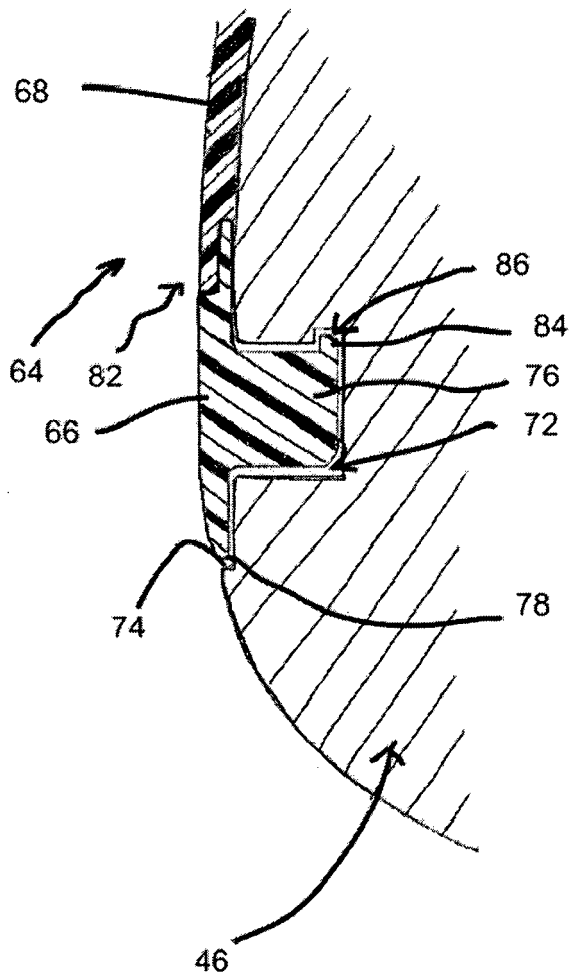


FIG. 6

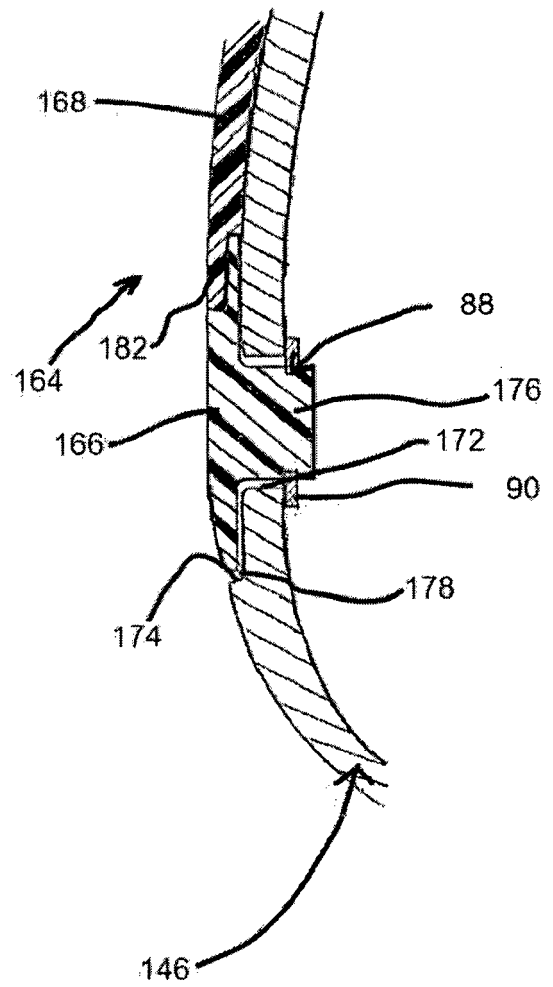


FIG. 8

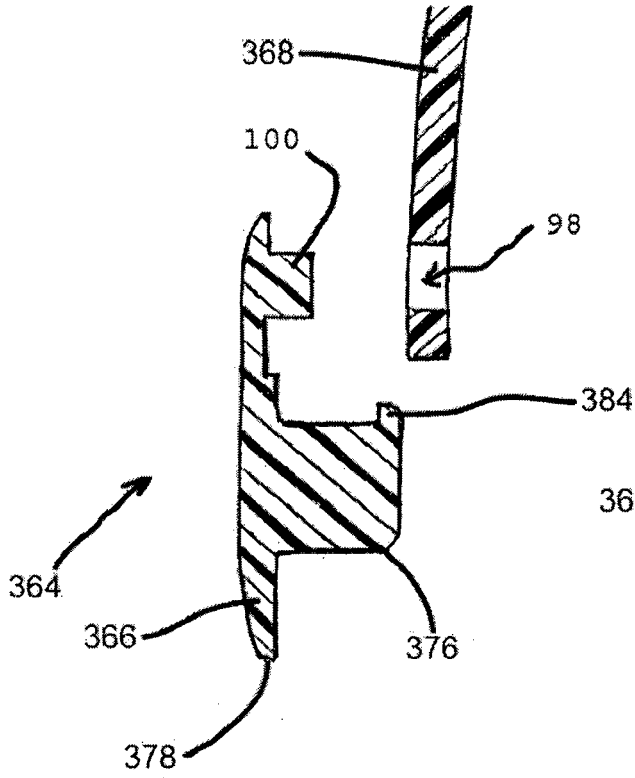
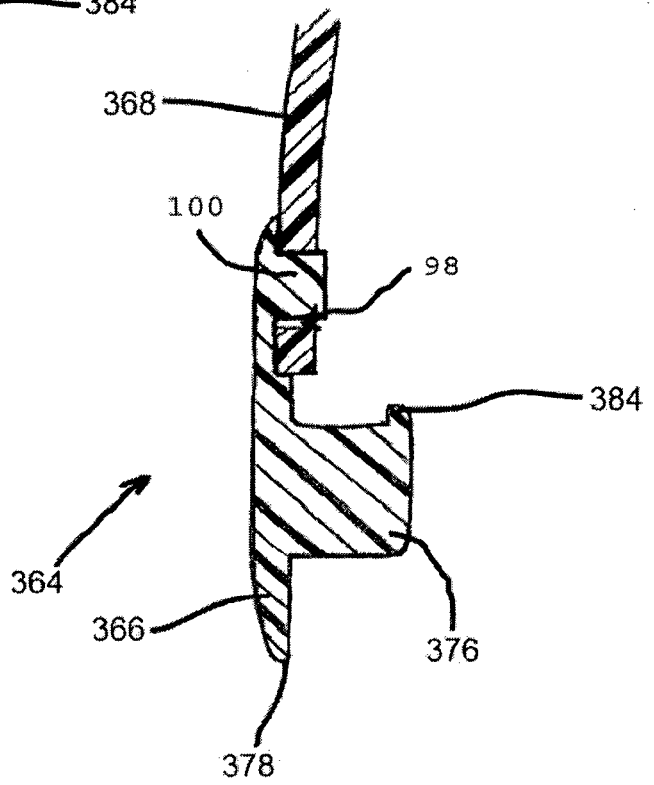


FIG. 9



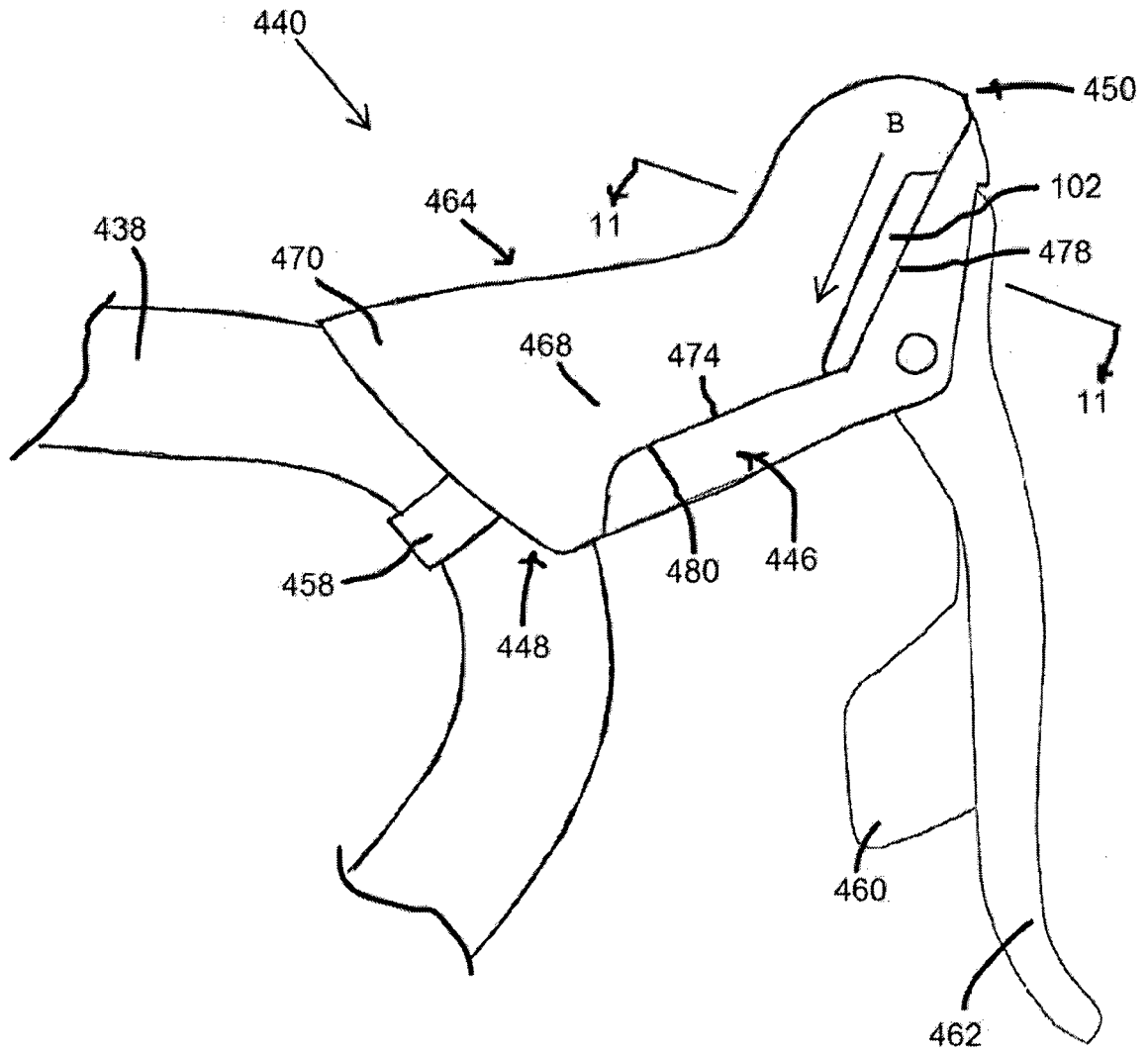


FIG. 10

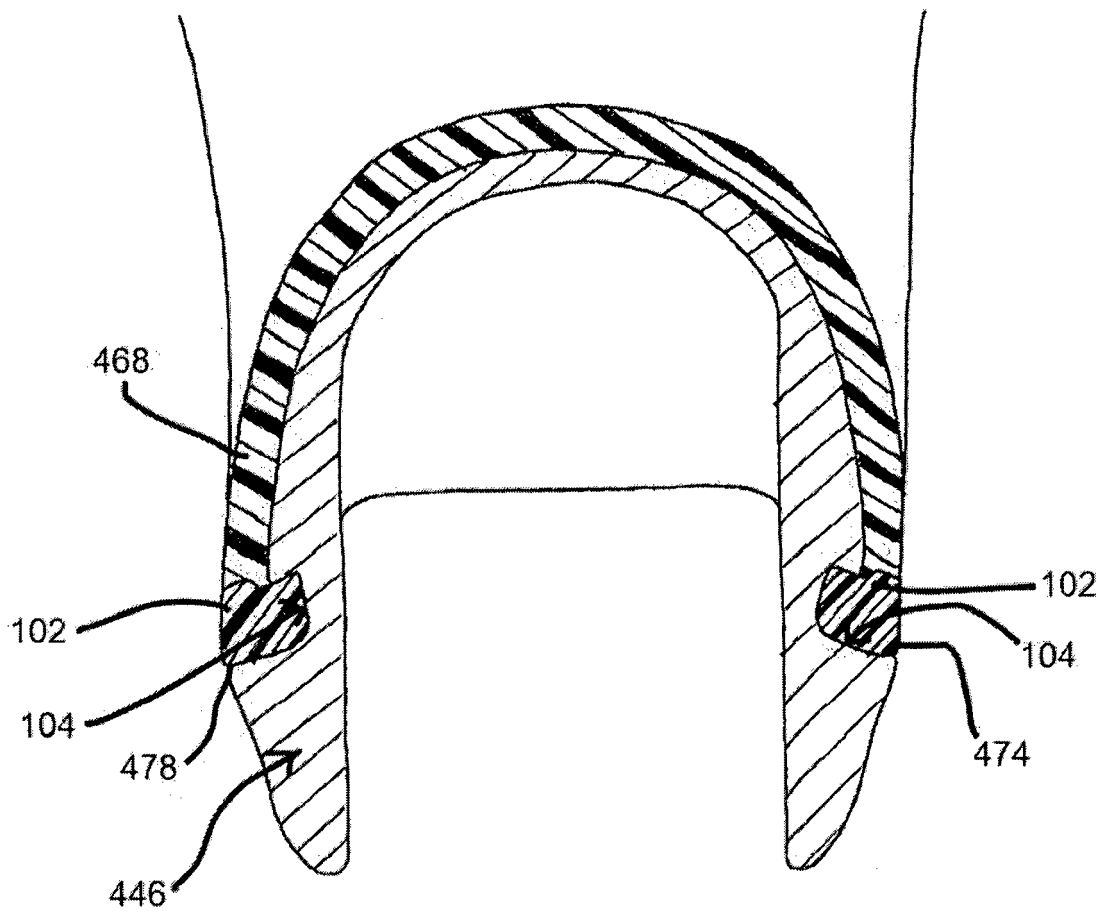


FIG. 11

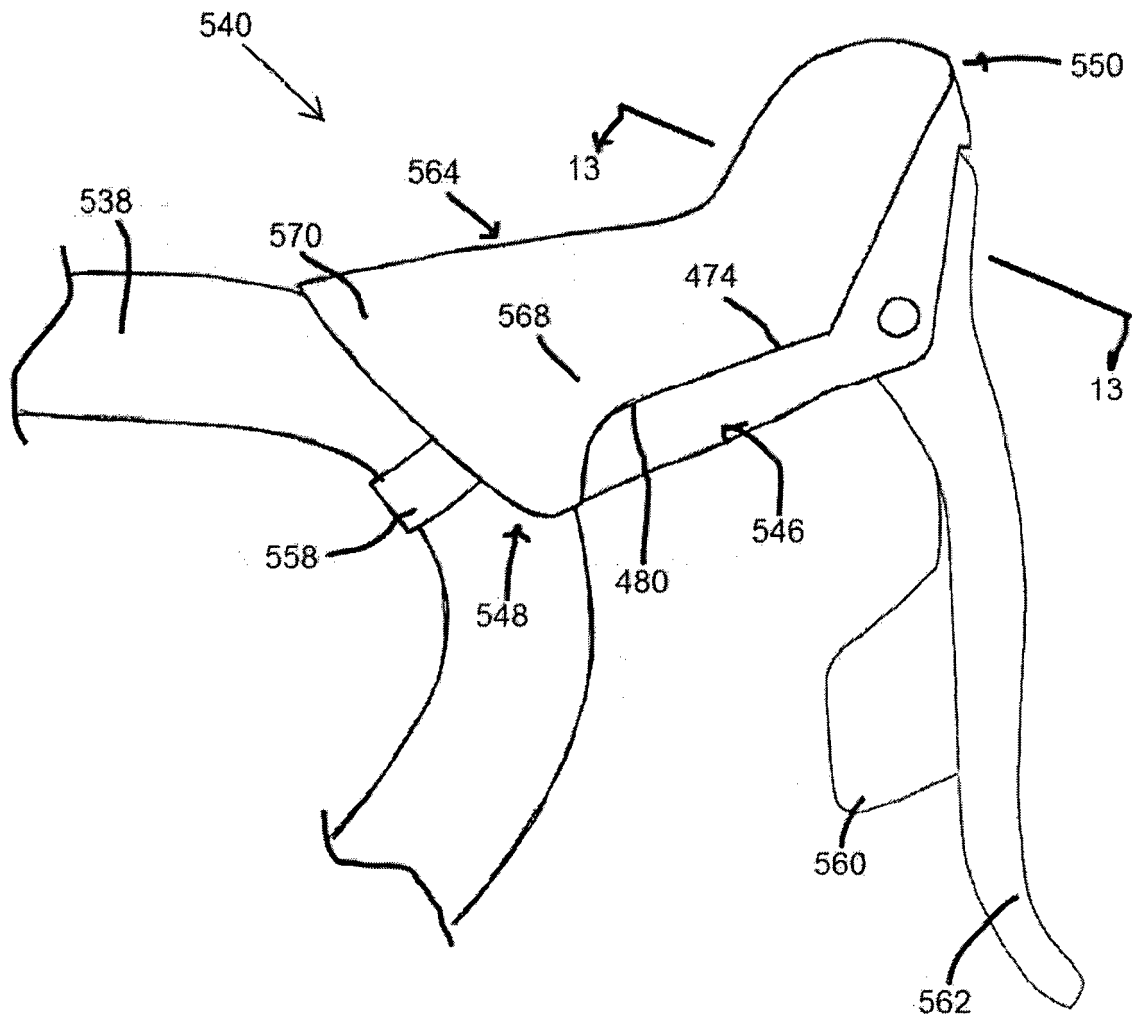


FIG. 12

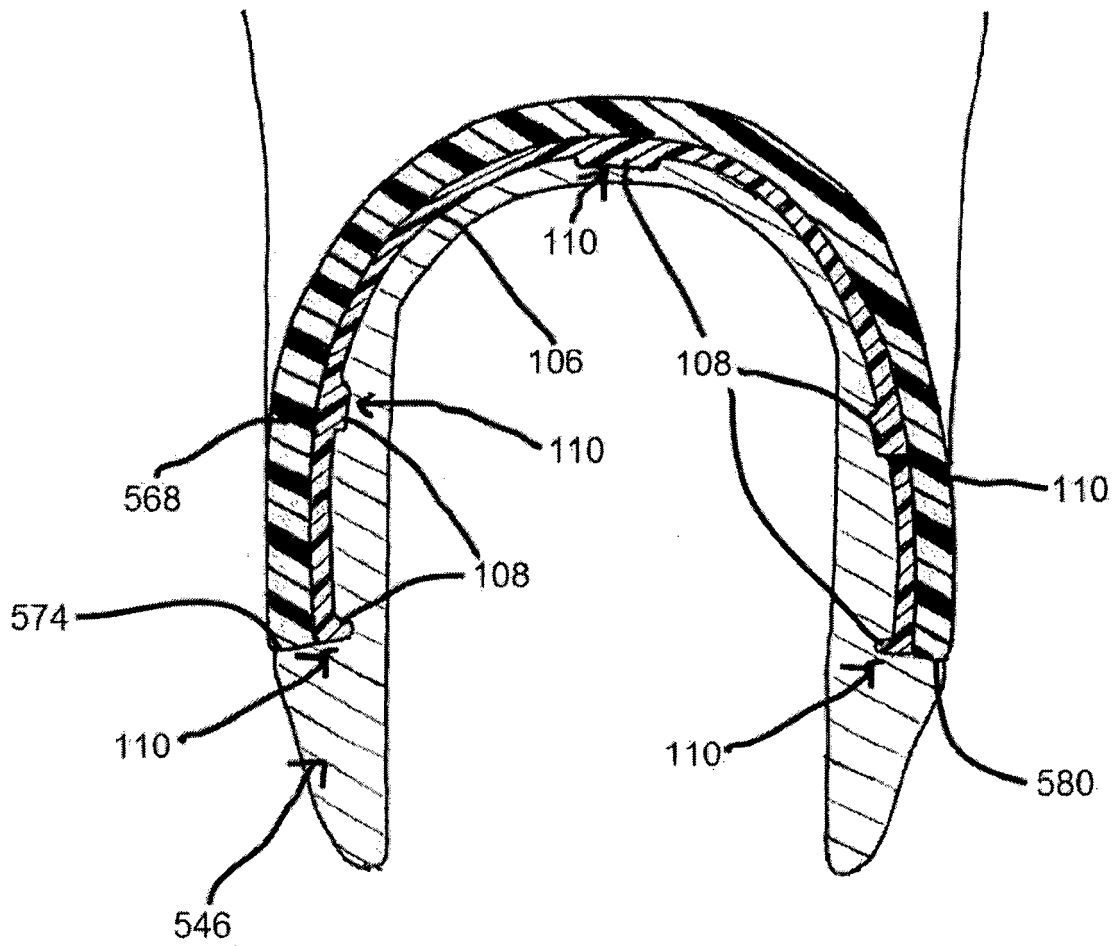


FIG. 13

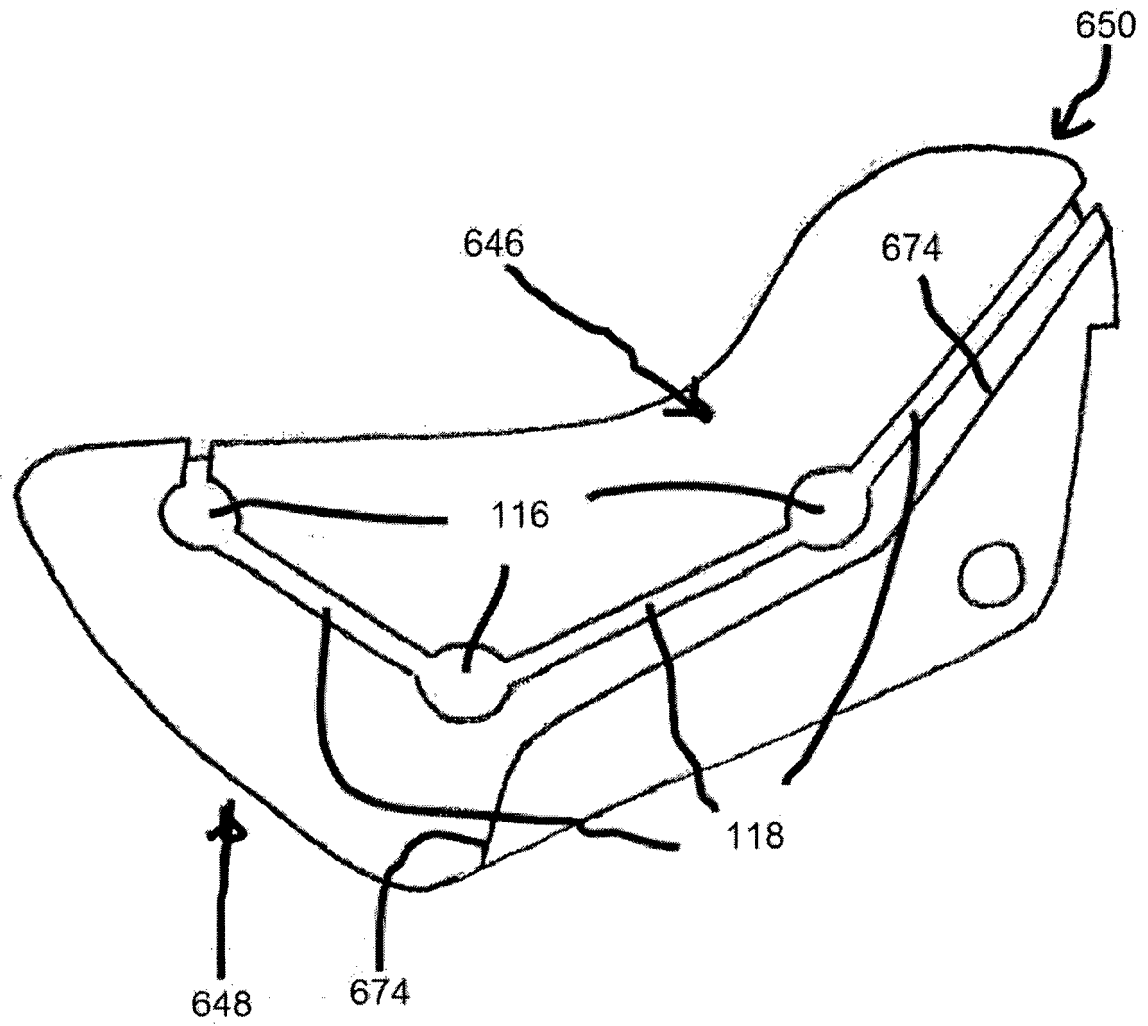


FIG. 14

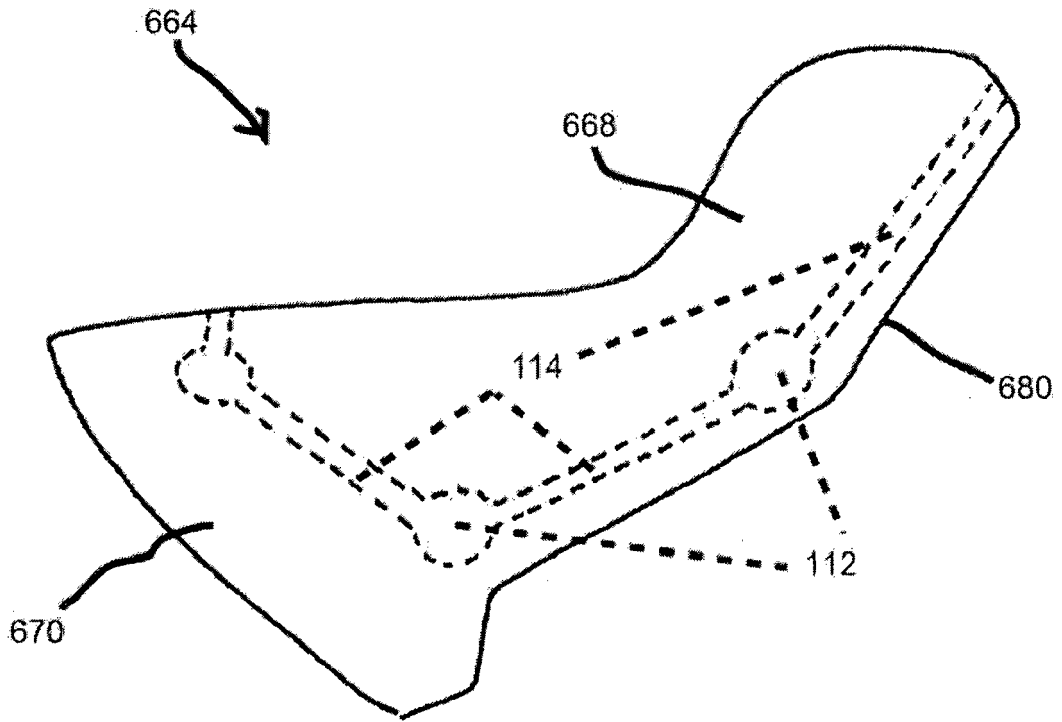


FIG. 15

FIG. 16

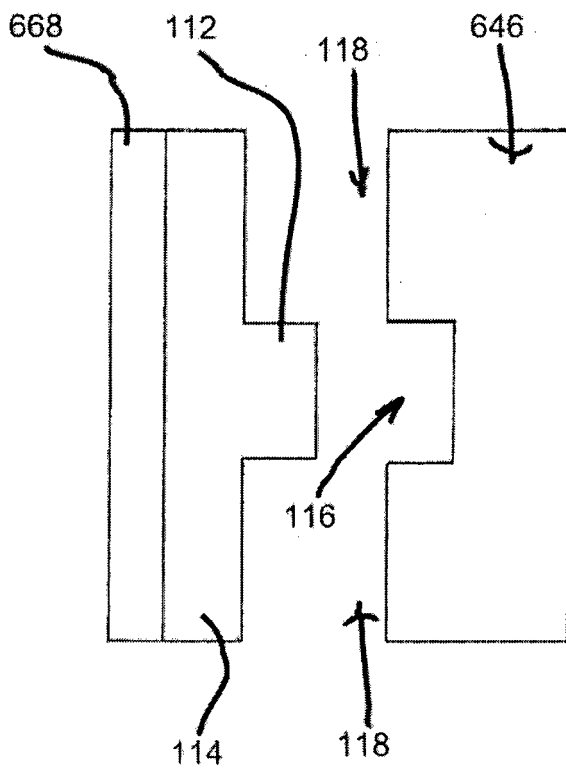


FIG. 17

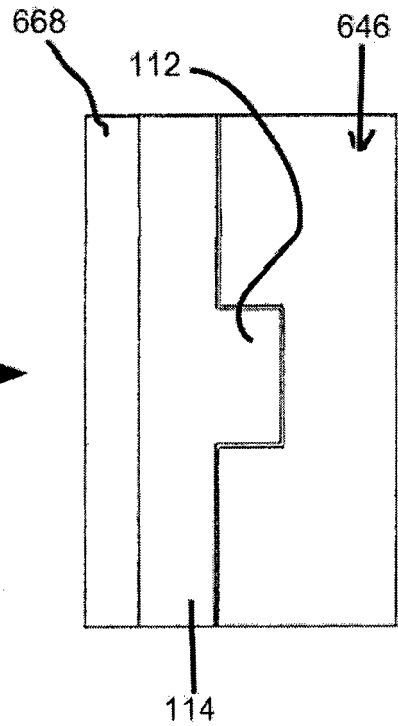
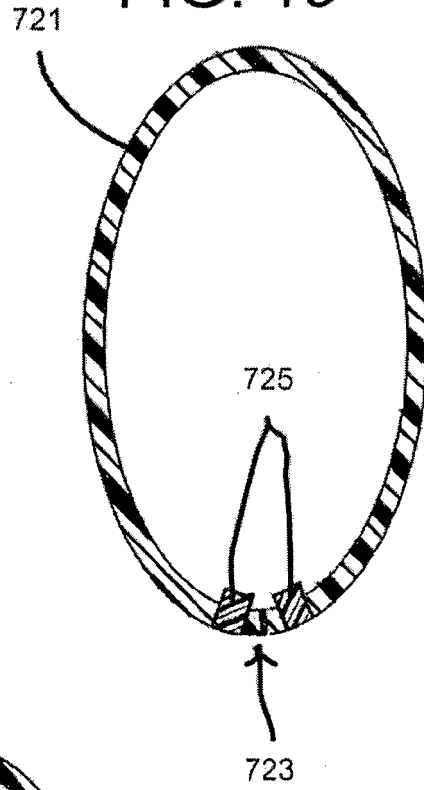


FIG. 18



FIG. 19



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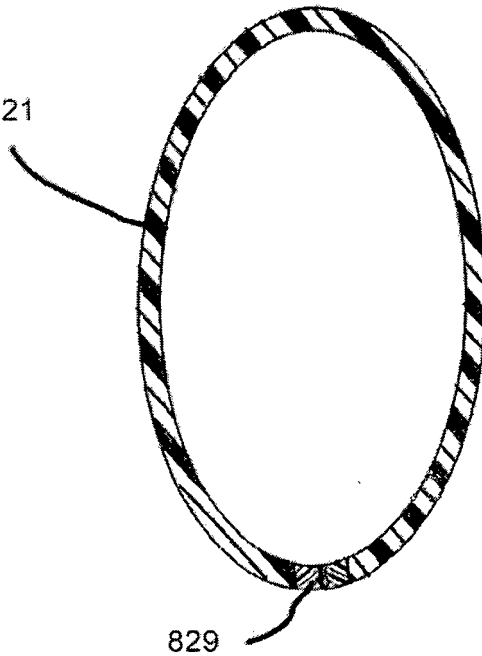


FIG. 20

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 2535250 A2 [0002]